REMARKS

Amendments

Claim 1 is amended to recite that at least one part of the polyvinylacetal-containing composition is introduced into said screw extruder via at least one side stream inlet. Thus, claim 1 is amended to incorporate the recitation of claim 6, now cancelled. In addition, claim 1 is amended to expressly recite the main inlet of the extruder, thereby providing express antecedent basis for the main inlet recited in, for example, claim 9.

Claims 7-8 and 20 are amended to depend from claim 1, rather than cancelled claim 6. Claim 8 is amended to expressly recite "cooling means," thereby providing express antecedent basis for the cooling means recited ion claim 12. Claims 9 and 11 are amended to use language in accordance with conventional US practice. Claim 23 is amended to recite that the polyvinylacetal-containing composition contains external softener. New claim 46 is directed to a further embodiment of the invention and is supported throughout the disclosure. See, for example, the paragraph bridging pages 9-10.

Withdrawn Claims

The Examiner argues that the common technical feature is the method of producing polyvinylacetal granulates and that such is taught by Hofmann (WO 02/12356). Applicants' disagree.

With respect to the present claims, the common technical feature is the manufacture of polyvinylacetal granulates by a process comprising converting a polyvinylacetal-containing composition into a molten state by heating to 100 to 340 °C in a single or double screw extruder, and granulating the resultant material to the desired particle sizes, wherein at least one part of a polyvinylacetal-containing composition is introduced into a screw extruder via at least one side stream inlet. Hofmann does not teach or suggest such a process.

Withdrawal of the Restriction Requirement and examination of all pending claims is respectfully requested.

Rejection under 35 USC 102(b)

Claims 1, 13, 22, 27, and 39 are rejected under 35 USC 102(b) as being anticipated by

the disclosure of Hofmann (WO 02/12356). This rejection is respectfully traversed.

Hofmann discloses a process for providing a non-blocking polyvinylbutyral (PVB) composition containing a chemically-modified PVB polymer. The chemically-modified PVB is the reaction product of PVB having hydroxyl function and a second component which reacts with the hydroxyl function of PVB, for example, a polymer with an anhydride function.

Thus, as described at page 5, lines 1-5 of the Hofmann disclosure, the process comprises: heating the PVB and second component to obtain a melt blend, cooling the melt blend to obtain a solid composition, and pelletizing the solid composition. Hoffmann discloses at page 5, lines 11-13 that the melt blend can be obtained by heating to the mixture to 100-260 °C.

As noted above, claim 1 is amended to incorporate the feature recited in claim 6 (now cancelled). The present rejection has not been applied against claim 6. Hofmann does not disclose or suggest introducing at least one part of the PVB composition into the screw extruder via at least one side stream inlet.

In view of the above remarks, it is respectfully submitted that the disclosure of Hofmann (WO 02/12356) fails to describe each and every element of applicants' claimed process. Thus, Hofmann fails to anticipate applicants' claimed invention under 35 USC 102(b). Withdrawal of the anticipation rejection in view of the disclosure of Hofmann is respectfully requested.

Rejection under 35 USC 103(a) in view of Hofmann and Schwind et al.

Claims 4 and 38 are rejected under 35 USC 103(a) as being obvious in view of Hofmann (WO 02/12356) and Schwind et al. (US 2002/0017735). This rejection is respectfully traversed.

The disclosure of Hofmann (WO 02/12356) is discussed above. In the rejection it is acknowledged that Hofmann does not disclose performing granulation by hot or cold pelletization. In this regard, the rejection refers to the disclosure of Schwind et al. (US 2002/0017735).

However, the Schwind et al. process is not a process for forming granules or pellets. Instead, Schwind et al. disclose a method for manufacturing synthetic fibers from a melt mixture of fiber forming matrix polymers. At least one second amorphous additive polymer

is added to the fiber forming polymer matrix, wherein the amorphous additive polymer is immiscible with the fiber forming matrix polymer. The additive polymer is said to be synthesized by multiple initiation. In any event, Schwind et al. expressly disclose that the inventive method "does not require granulation of the additive polymer elongation increasing agent." See paragraph [0021].

The rejection refers to paragraph [0131]. This paragraph states that the "elongation increasing agent to be used in the invention is not granulated, in contrast to the state of the art." The paragraph further describes known processes of cold pelletization and hot pelletization. However, since the disclosure of Schwind et al. seeks to avoid granulation/pelletization, one skilled in the art would not look to the Schwind et al. to modify a granulation/pelletization procedure.

Furthermore, as noted above, claim 1 is amended to incorporate the feature recited in claim 6 (now cancelled). The present rejection has not been applied against claim 6. Neither Hofmann nor Schwind et al. disclose introducing at least one part of a PVB composition into a screw extruder via at least one side stream inlet.

In view of the above remarks, it is respectfully submitted that the disclosure of Hofmann (WO 02/12356), taken alone or in combination with the disclosure of Schwind et al. (US 2002/0017735), fails to suggest applicants' claimed invention. Withdrawal of the rejection is respectfully requested.

Rejection under 35 USC 103(a) in view of Hofmann and Lerman et al.

Claims 5, 25, 26, and 40-45 are rejected under 35 USC 103(a) as being obvious in view of Hofmann (WO 02/12356) and Lerman et al. (US 3,472,801). This rejection is respectfully traversed.

The disclosure of Hofmann (WO 02/12356) is discussed above. In the rejection it is acknowledged that Hofmann does not disclose adding a foaming agent to a polyvinylacetal-containing composition during conversion of the composition to a molten state. In this regard, the rejection refers to the disclosure of Lerman et al. (US 3,472,801).

Lerman et al. disclose a process for forming foamed spherical particles of thermoplastic polymer. Lerman et al. disclose that the polymer can be selected from a broad generic class of materials. See column 3, line 72 – column 4, line 15. All of the Examples

disclosed by Lerman et al. employ polyethylene and ethylene-acetate, not a polyvinylacetal such as PVB. Compare the Hofmann disclosure.

In addition, Lerman et al. does not disclose a process involving heating a PVB composition to obtain a melt blend, cooling the melt blend to obtain a solid composition, and then pelletizing the solid composition. Here again, compare the Hofmann disclosure. In the process of Lerman et al. a granular, powdered, or extruded polymer containing a blowing agent is melted and dispersed in a liquid. This dispersion is then further heated to expand or foam the melted particle with spherizing and possible coalescence. Then, while still in a dispersed sate, the particles are cooled, collected, and separated from dispersion medium. See column 2, lines 24-65, and the Examples. Thus, in the process of Lerman et al. the already formed granulates are melted and then expanded. There is no granulation performed after the described meting step.

Lerman et al. do refer to granulation at column 6, lines 13-15. However, this granulation refers to the formation of the granules or particles prior to the melting step of the Lerman et al. process. Specifically, at column 5, line 60 – column 6, line 15, Lerman et al. disclose combining polymer particles with a blowing agent. In particular, Lerman et al. disclose that:

> Satisfactory degrees of mixing dry ingredients can be readily accomplished by mechanical means, such as tumbling, air agitation, dry spraying, and the like. The resultant mixture is a homogeneous, free flowing powder, ready for melting with heat into a relative uniform blend.

Lerman et al. at column 6, lines 5-15 also describe incorporating the blowing agent into the polymer material by mixing using, for example, a screw extruder and controlling temperature to aid in blending the blowing agent and polymer in a manner gas generation is avoided. Thereafter, the blended material can be subjected to conventional granulation methods.

In the rejection it is argued that the use of "foam" is well known in making porous products. However, Hofmann does not disclose a process for making foamed products. Thus, the rejection presents no rationale as to why one would modify the process of Hofmann so as to produce a foamed product.

It is also argued in the rejection that it is known to vary density based on the types of

polymer and additives used, and also on the operating conditions. Similarly, it is argued that it is known to alter size, density, and color of the product depending on the use of the resultant product. Such general assertions do not, however, provide a reason to modify the process of Hofmann in such a manner as to provide particles exhibiting the properties recited in any of applicants' claims 25, 26, and 40-45.

Furthermore, as noted above, claim 1 is amended to incorporate the feature recited in claim 6 (now cancelled). The present rejection has not been applied against claim 6. Neither Hofmann nor Lerman et al. disclose introducing at least one part of a PVB composition into a screw extruder via at least one side stream inlet.

In view of the above remarks, it is respectfully submitted that the disclosure of Hofmann (WO 02/12356), taken alone or in combination with the disclosure of Lerman et al. (US 3,472,801), fails to suggest applicants' claimed invention. Withdrawal of the rejection is respectfully requested.

Rejection under 35 USC 103(a) in view of Hofmann and Applicants' Admission

Claims 6, 7, 23 and 29 are rejected under 35 USC 103(a) as being obvious in view of Hofmann (WO 02/12356) and the asserted admission in the specification at page 10, lines 24-29. This rejection is respectfully traversed.

As discussed above, the disclosure of Hofmann fails to disclose or suggest a method for manufacturing of a granulate from a polyvinylacetal-containing composition by converting the composition into a molten state, by heating to 100 to 340 °C in a single or double screw extruder, wherein at least one part of the polyvinylacetal-containing composition is introduced into the screw extruder via at least one side stream inlet, and then granulating the resultant material.

In the rejection, it is asserted that applicants have admitted that it is known to transfer polyvinylacetal composition into an extruder via a side stream inlet, citing page 10, lines 24-29. **This assertion is incorrect.**

At page 10, lines 24-29 of the specification, applicants disclose that side stream channels are known for introducing additives into a melt. The following is the relevant disclosure from applicants' specification:

The side stream channel is known among experts, wherein additives to a melt

> are usually mixed into the extruder via this entry. The feeding in can otherwise be carried out by means of a side stream dosing line connected to the extruder, which can have at least one screw-conveyor. In this case the side stream dosing can for example have one or two screw-conveyors.

This portion of the disclosure does **not** state that it is known in the art to introduce the polyvinylacetal-containing composition into a screw extruder via a side stream inlet in making granulates from a polyvinylacetal-containing composition. Instead, this portion of the disclosure indicates that it is known to use a side stream channel to introduce additives into a polymer melt.

Neither the disclosure of Hofmann nor the asserted applicants' admission at page 10, lines 24-29 disclose that it is known in the art to use a side stream inlet to introduce polyvinylacetal composition into an extruder in a process for making granulates from a polyvinylacetal-containing composition.

With regards to applicants' claim 23, it is asserted in the rejection that applicants have admitted that external softeners are known in the art. At page 46, applicants do disclose that:

> External softeners can be separated by means of suitable methods, for example extraction from the granulate or the composition for preparation of the granulate. The exact parameters of the method are known to those skilled in the art, wherein these are dependant on individual softeners.

However, merely because softeners are asserted to be known in the art, this does not provide any rationale for adding external softener in an amount of at the most 2 wt% to the PVB composition of Hofmann.

In view of the above remarks, it is respectfully submitted that the disclosure of Hofmann (WO 02/12356), taken alone or in combination with the applicants' admission regarding that which is known in the art, fails to suggest applicants' claimed invention. Withdrawal of the rejection is respectfully requested.

Rejection under 35 USC 103(a) in view of Hofmann, Applicants' Admission, and Kiyono et al.

Claims 8 and 12 are rejected under 35 USC 103(a) as being obvious in view of Hofmann (WO 02/12356), the asserted admission in the specification at page 10, lines 24-29,

and Kiyono et al. (US 3,679,788). This rejection is respectfully traversed.

The disclosure of Hofmann (WO 02/12356) and applicants' disclosure at page 10, lines 24-29 are discussed above. In the rejection it is acknowledged that these disclosures do not disclose cooling the side stream inlet, or cooling the side stream inlet to a temperature which is less than or equal to the glass transition temperature of the polyvinylacetal-containing composition

However, the rejection asserts that "the side stream inlet would typically be at ambient conditions." No evidence or arguments are offered in support of this conclusory statement. Nor does an assertion of ambient temperature suggest an active step of cooling.

Additionally, the rejection asserts that Kiyono et al. (US 3,679,788) disclose that cooling may be used to prevent unwanted melting in areas of an extruder. Specifically, the rejection refers to column 4, lines 39-51 of Kiyono et al.

Kiyono et al. disclose a process comprising feeding thermoplastic resin into a screw type extruder; rotating the screw to transfer the resin maintained in an unmolten state; injecting liquid matter into the extruder to mix with the unmelted resin; continuously rotating the screw to mix and disperse the liquid matter in the unmelted resin and to advance the mixture towards the extruder outlet; and further continuing to rotate the screw to melt the mixture, and knead and extrude the resultant molten mixture.

At column 4, lines 39-51, Kiyono et al. disclose that it is " necessary" to prevent the thermoplastic resin from melting during the mixing with the liquid matter in the extruder, i.e., it needs to be maintained in unmolten state. To prevent melting during this mixing step, Kiyono et al. forcibly cool "certain portions of cylinder and screws at which the resin should be maintained un-molten, with suitable coolant such as water."

The process of Hofmann (WO 02/12356) does not involve injecting liquid matter into the extruder to mix with the unmelted resin. Thus, the disclosure of Kiyono et al. provides no suggestion of modifying the Hofmann process to use a side stream inlet to introduce at least part of the PVB composition into a screw extruder, and to further cool such a side stream inlet. Similarly, Kiyono et al. do not suggest cooling such a side stream inlet to a temperature less than or equal to the glass transition temperature of the PVB composition of Hofmann.

In view of the above remarks, it is respectfully submitted that the disclosure of Hofmann (WO 02/12356), taken alone or in combination with the applicants' admission

regarding that which is known in the art and/or the disclosure of Kiyono et al., fails to suggest applicants' claimed invention. Withdrawal of the rejection is respectfully requested.

Rejection under 35 USC 103(a) in view of Hofmann and Kiyono et al.

Claims 9-11 and 14 are rejected under 35 USC 103(a) as being obvious in view of Hofmann (WO 02/12356) and Kiyono et al. (US 3,679,788). This rejection is respectfully traversed.

The disclosure of Hofmann (WO 02/12356) and Kiyono et al. (US 3,679,788) are discussed above. As noted, Kiyono et al. disclose that with regards to their process it is "necessary" to prevent the thermoplastic resin from melting during the mixing with liquid matter in the extruder, and that to prevent such melting during the mixing step, Kiyono et al. forcibly cool "certain portions of cylinder and screws at which the resin should be maintained un-molten, with suitable coolant such as water."

The process of Hofmann (WO 02/12356) does not involve injecting liquid matter into the extruder to mix with the unmelted resin. Thus, the disclosure of Kiyono et al. provides no suggestion of modifying the Hofmann process to cool, for example, an extruder screw or a region of an extruder from the main inlet up to a length equal to at least 15 times the screw length/screw diameter ratio.

In view of the above remarks, it is respectfully submitted that the disclosure of Hofmann (WO 02/12356), taken alone or in combination with the disclosure of Kiyono et al., fails to suggest applicants' claimed invention. Withdrawal of the rejection is respectfully requested.

Rejection under 35 USC 103(a) in view of Hofmann and Rosato

Claims 15-16 are rejected under 35 USC 103(a) as being obvious in view of Hofmann (WO 02/12356) and the excerpt from Rosato. This rejection is respectfully traversed.

The disclosure of Hofmann (WO 02/12356) is discussed above. The rejection relies on the disclosure of Rosato with regards to venting an extruder screw. At page 221, Rosato disclose that the "major approach" to achieve venting is to provide vents in the extruder barrels.

The rejection asserts that one of ordinary skill in the art knows that gases will escape

through the main inlet "if the feed port is vented and no feed material is present." However, the rejection present no rationale as to why the main extruder inlet in the process of Hofmann would be devoid of any feed material.

In any event, neither Hofmann nor Rosato disclose or suggest introducing at least one part of a PVB composition into a screw extruder via at least one side stream inlet. In view of the above remarks, it is respectfully submitted that the disclosure of Hofmann (WO 02/12356), taken alone or in combination with the disclosure in the excerpt by Rosato, fails to render obvious applicants' claimed invention. Withdrawal of the rejection is respectfully requested.

Rejection under 35 USC 103(a) in view of Hofmann, Applicants' Admission, and Nachtergaele

Claims 17-20 are rejected under 35 USC 103(a) as allegedly being obvious in view of Hofmann (WO 02/12356), applicants' admitted prior art, and Nachtergaele (US 5,032,337). This rejection is respectfully traversed.

The disclosure of Hofmann (WO 02/12356) and applicants' asserted admission are discussed above. Nachtergaele disclose a process for making a mixture of starch and polyvinyl alcohol wherein the resultant mixture is s soluble in cold water. In the process, 50 to 95 parts by weight starch and 5 to 50 parts by weight polyvinyl alcohol are thoroughly mixed, the moisture content is regulated between 10-25 wt %, and the mixture is subjected to a thermo-mechanical treatment at a temperature situated between 110° and 180° C during which the mixture is subjected to shearing forces. The thermo-mechanical treatment can be an extrusion.

The rejection refers to the disclosure at column 3, lines 24-34. In this portion of the disclosure, Nachtergaele describe a "suitable" extrusion apparatus for his process which has an extruder with a capacity of 18 kg of product per hour, a length diameter ratio of 7, a dosing screw which rotates at 13 revolutions per minute, and an extrusion screw which rotates at 97 revolutions per minute.

Thus, Nachtergaele disclose an extruder which has a dosing screw. However, as noted above, neither the disclosure of Hofmann nor the asserted applicants' admission at page 10, lines 24-29 disclose that it is known to use a side stream inlet to introduce a

polyvinylacetal composition into an extruder in a process for preparing a granulate from a polyvinylacetal-containing composition. Nachtergaele also does not suggest modifying the process of Hofmann in such a manner as to arrive at an embodiment wherein a side stream inlet is used to introduce a polyvinylacetal composition into an extruder. Similarly, Nachtergaele also does not suggest using a dosing screw in such a side stream inlet.

In the rejection, it is asserted that it would be obvious to use a dosing screw to control the amount of feed materials. However, this assertion does not provide any rationale for modifying the Hofmann process so as to use a side stream inlet to introduce polyvinylacetal composition into an extruder, and to further provide that side stream inlet with a dosing screw.

In view of the above remarks, it is respectfully submitted that the disclosure of Hofmann (WO 02/12356), taken alone or in combination with applicants' asserted admission and/or the disclosure of Nachtergaele, fails to render obvious applicants' claimed invention. Withdrawal of the rejection is respectfully requested.

Rejection under 35 USC 103(a) in view of Hofmann and Miyake et al.

Claims 21 and 29 rejected under 35 USC 103(a) as allegedly being obvious in view of Hofmann (WO 02/12356) and Miyake et al. (US 2003/010936). This rejection is respectfully traversed.

The disclosure of Hofmann is discussed above. Miyake et al. disclose a polyvinyl acetal resin for use in heat-developable photosensitive materials. The resin is synthesized by acetalization between a polyvinyl alcohol and an aldehyde, and the resultant resin has a specified degree of polymerization, a specified residual acetyl content, a specified hydroxyl content, a specified water content, a specified residual aldehyde content, and is free of antioxidant. See paragraphs [0012]-[0015]. In paragraph [0050], Miyake et al. disclose that the "glass transition temperature of the polyvinyl acetal resin of the invention for heat-developable photosensitive materials is preferably 55 to 110 °C." (emphasis added)

The PVB composition of Hofmann is not intended for use in heat-developable photosensitive materials. Thus, Miyake et al. provide no suggestion as to desirable glass transition temperatures for the PVB composition of Hoffmann.

In any event, neither Hofmann nor Miyake et al. disclose or suggest introducing at

least one part of a PVB composition into a screw extruder via at least one side stream inlet. In view of the above remarks, it is respectfully submitted that the disclosure of Hofmann (WO 02/12356), taken alone or in combination with the disclosure by Miyake et al. (US 2003/010936), fails to render obvious applicants' claimed invention. Withdrawal of the rejection is respectfully requested.

Rejection of Claim 28 under 35 USC 103(a) in view of Hofmann

Claim 28 is rejected under 35 USC 103(a) as allegedly being obvious in view of Hofmann (WO 02/12356). This rejection is respectfully traversed.

In the rejection, it is acknowledged that Hofmann does not disclose the use of a polyvinylacetal obtainable through reaction of at least a polymer (A) with at least a compound (B), in accordance with applicants' claim 28. But, because claim 28 uses the term "obtainable," it is asserted in the rejection that this language "renders this claim limitation as one of many formulations that would qualify as a polyvinyl acetal containing material." This assertion is confusing. The term "obtainable" merely indicates that the polyvinylacetal in question must be one that can be obtained by reacting together polymer (A) and compound (B).

The rejection further asserts that since Hofmann disclose PVB as a polyvinyl acetal composition "it would be obvious to one having skill in the art to use many combinations of materials to create a material suitable for the intended end use of the product." This assertion is also unclear, particularly as to what is meant by "many combinations."

The rejection fails to describe why one would modify the PVB composition of Hofmann in such a manner as to arrive at a polyvinylacetal obtainable through reaction of at least a polymer (A) with at least a compound (B), in accordance with applicants' claim 28.

Additionally, as noted above, Hofmann does not disclose or suggest introducing at least one part of a PVB composition into a screw extruder via at least one side stream inlet. In view of the above remarks, it is respectfully submitted that the disclosure of Hofmann (WO 02/12356) fails to render obvious applicants' claimed invention. Withdrawal of the rejection is respectfully requested.

Rejection under 35 USC 103(a) in view of Hofmann and Kroggel et al.

Claims 30 and 31 rejected under 35 USC 103(a) as allegedly being obvious in view of Hofmann (WO 02/12356) and Kroggel et al. (US 5,559,175). This rejection is respectfully traversed.

In the rejection, it is asserted that Kroggel et al. disclose adding fibers to polyvinyl dispersions, citing column 8, lines 44-65. This is in correct.

At column 8, lines 44-65, Kroggel et al. describe uses of their aqueous polyvinyl acetal dispersions and dry polyvinyl acetal powders obtained therefrom. The uses include "for gluing various materials such as metals, ceramic materials, plastics, fibers, films, textiles, paper and wood." Thus, the reference to fibers concerns gluing fibers together, not to a granulate prepared by extrusion and pelletization that contains fibers.

Additionally, neither Hofmann nor Kroggel et al. disclose or suggest introducing at least one part of a PVB composition into a screw extruder via at least one side stream inlet. In view of the above remarks, it is respectfully submitted that the disclosure of Hofmann (WO 02/12356), taken alone or in combination with the disclosure of Kroggel et al., fails to render obvious applicants' claimed invention. Withdrawal of the rejection is respectfully requested.

The Commissioner is hereby authorized to charge any fees associated with this response or credit any overpayment to Deposit Account No. 13-3402.

Respectfully submitted,

/Brion P. Heaney/

Brion P. Heaney, Reg. No. 32,542
Attorney for Applicants

MILLEN, WHITE, ZELANO & BRANIGAN, P.C.
Arlington Courthouse Plaza 1
2200 Clarendon Boulevard, Suite 1400
Arlington, VA 22201
Telephone: 703-243-6333
Facsimile: 703-243-6410
Attorney Docket No.: KURARAY-0012

Date: December 1, 2009